CHAPTER 12

HYDROLOGY AND WATER QUALITY

12.0 HYDROLOGY AND WATER QUALITY

12.1 ENVIRONMENTAL SETTING

12.1.1 Surface Water Hydrology

Regional Water Resources

The proposed project is located within the Sacramento River Basin, which is bounded by the Sierra Nevada to the east, the Coast Ranges to the west, the Cascade Range and Trinity Mountains to the north, and the Delta-Central Sierra area to the south. The Sacramento River is the principal stream in the basin. Its major tributaries are the Pit and McCloud Rivers, which join the Sacramento River from the north, and the Feather and American Rivers, which are tributaries from the east.

The proposed project is tributary to four watersheds: Auburn Ravine, Clover Valley Creek, Ingram Slough and Dutch Ravine (Figure 12-1). The majority of the site, around 1050 acres, drains to Auburn Ravine; the remainder of the site drains into Ingram Slough (approximately 200 acres), a tributary of Auburn Ravine, and Clover Valley Creek (625 acres), a tributary of Dry Creek. The balance of the site drains to Dutch Ravine which also is a tributary of Auburn Ravine.

Auburn Ravine

Auburn Ravine is a perennial stream originating just west of the town of Auburn, approximately 10 miles east of the project site. From Auburn, the creek flows southwest through Lincoln and north of the project site. The Auburn Ravine watershed drains a total area of 79 square miles; above the City of Lincoln, the watershed drains an area of approximately 33 square miles (City of Lincoln et al., 1998). Flows are seasonable and variable. Diversions from the Nevada Irrigation District and PG&E, and discharges from the City of Auburn wastewater treatment plant contribute to flows in the summer, when the creek would otherwise be dry in average to drought conditions (DeWante and Stowell/QUAD, 1992).

Auburn Ravine flows into Sutter County about 10 miles west of the City of Lincoln and ultimately empties into the East Side Canal, which, in turn, empties into the Cross Canal approximately one mile east of SR 99. The Cross Canal empties into the Sacramento River approximately 10 miles north of Sacramento and about one mile below the confluence of the Feather River and the Sacramento River.

Ingram Slough

Ingram Slough is an intermittent watercourse originating in the foothills east of the City of Lincoln. It begins just west of Sierra College Boulevard near Twelve Bridges Drive and flows west and north through the northern part of the Twelve Bridges Specific Plan Area and passes under SR 65. Ingram Slough drains an area of approximately five square miles and is four miles long. Two parallel drainage branches run east to west. Low-flow channels of both branches intersect and combine approximately 500 feet east of SR 65 about one-half mile south of Auburn Ravine Bridge. West of the highway, Ingram Slough flows to the west and south for about three miles where it empties into Orchard Creek, and subsequently Auburn Ravine.

Clover Valley Creek

Clover Valley Creek originates on the project site and is intermittent above English Colony Way. The creek flows south and west through the Clover Valley Reservoir and empties into Antelope Creek about three miles south of the project site. The Clover Valley Creek subbasin is in the upper and northern portion of the Dry Creek watershed along its western ridge. About three miles south of the project site, Clover Valley Creek flows into Antelope Creek, a tributary of Dry Creek.

The Dry Creek watershed covers approximately 100 square miles in southwestern Placer county and northern Sacramento County. The Dry Creek headwaters originate in the Sierra Nevada foothills near Newcastle, flow southwesterly into the Sacramento Valley, then discharge into the Natomas East Main Drainage Canal (Jones & Stokes Associates, Inc., 1994).

The elevation of the Dry Creek watershed varies from approximately 1,200 feet above msl at the northeasternmost portion of the watershed to 30 feet above msl at the Natomas East Main Drainage Canal. The Dry Creek basin bridges the Sierra Nevada and Central Valley geologic provinces.

PCWA Facilities

Placer County Water Agency (PCWA) owns and operates two raw water canals that cross the Bickford Ranch property: the Caperton Canal and the Antelope Canal. The Antelope Canal enters the site from the south and flows directly to Clover Valley Reservoir. The Caperton Canal traverses the north side of the project, primarily crossing the Auburn Ravine drainage basins. Antelope Canal has a maximum capacity of 40 cfs and Caperton Canal has a maximum capacity of 25 cubic feet per second (cfs). Both canals are equipped with a series of high flow spillways that could discharge up to 10 cfs each onto the project site. The spillways (shown on Figure 3-18) only function when the capacity of the canal(s) is exceeded.

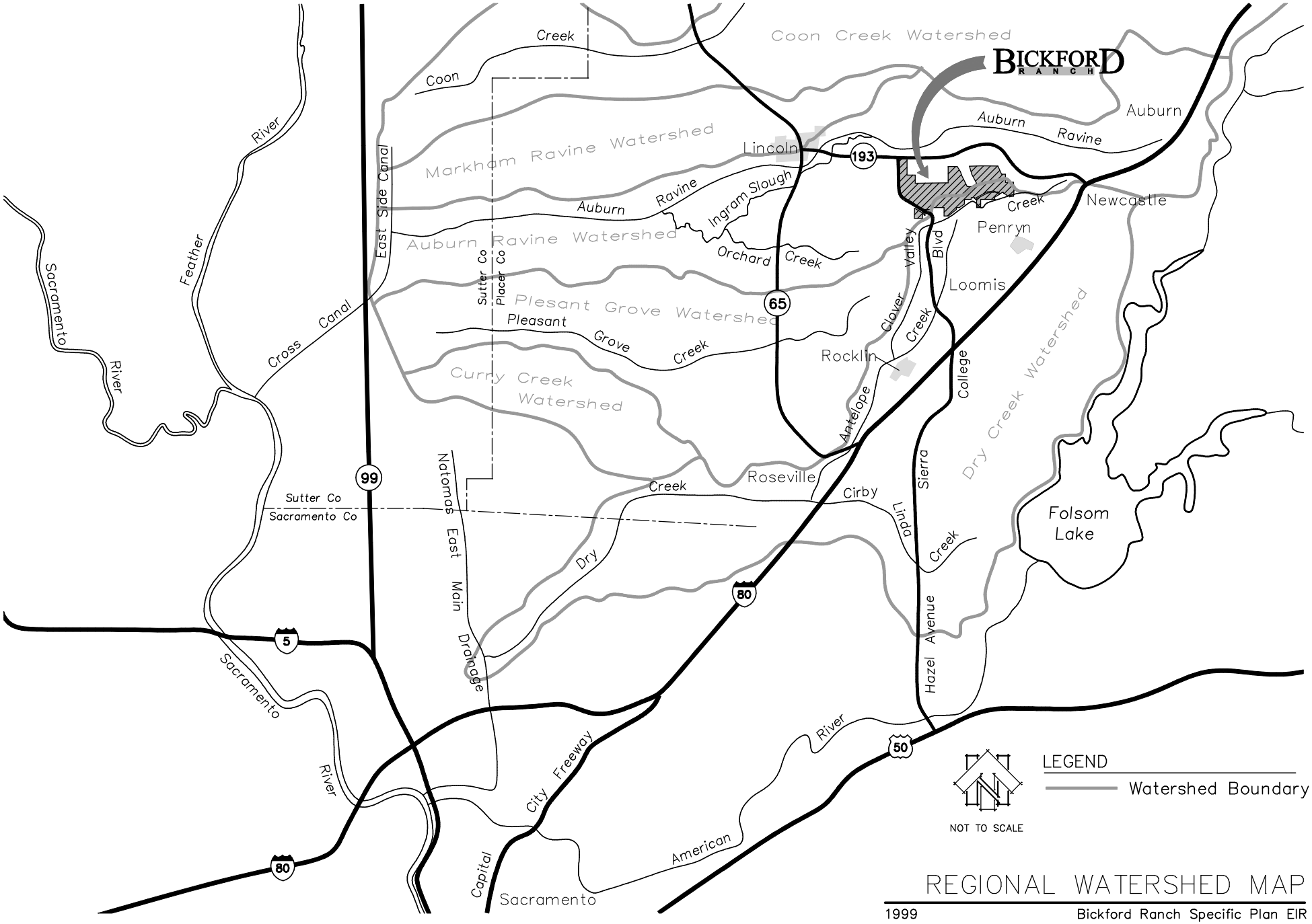
Regional Flooding

Regional and local floods occur from October through April. The floods are generally caused by a combination of prolonged rainfall leading to soil saturation and a short period of intense precipitation associated with frontal convection or severe thunderstorms.

Runoff from areas within western Placer County, in the vicinity of the cities of Lincoln, Roseville and Rocklin, drains through several stream courses (including Auburn Ravine, Orchard Creek, Ingram Slough, Pleasant Grove Creek and Dry Creek), which ultimately drain into the Sacramento River.

The Placer County Flood Control and Water Conservation District has sponsored three studies which reviewed the areas drained by the Auburn Ravine, Coon, and Pleasant Grove Creeks, and Dry Creek. These creeks and their tributaries flow through and drain western Placer County and southeastern Sutter county and portions of Sacramento County. The studies are:

- *Auburn Ravine, Coon, and Pleasant Grove Creeks Flood Mitigation*, Volumes 1 and 2 (CH2M Hill, 1993;
- *Placer/Sutter County Joint Flood Study, Auburn Ravine, Coon and Pleasant Grove Creeks* (CH2M Hill, 1994); and



REGIONAL WATERSHED MAP

1999
Job No. 21305-002-038

Bickford Ranch Specific Plan EIR
Placer County, California

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

FIGURE 12-1

990605B 6/7/99

- *The Placer County Flood Control and Water conservation District and Sacramento County Water Agency Final Report, Dry Creek Watershed Flood Control Plan* (J.M. Montgomery, 1992).

These studies were prepared to respond to the concern over potential increases in flooding and to develop potential mitigation for impacts associated with development.

Planned land uses within Placer County allow for industrial, commercial, and residential development that would normally increase flood flows and volumes. An extensive area upstream of the Cross Canal, in eastern Sutter County and western Placer County, has a history of periodically flooding as does Dry Creek through and downstream of the City of Roseville.

While development can have large impacts on peak flows and volumes, hydrologic modeling of the watershed indicated that "existing" upstream development in the Auburn Ravine/Pleasant Grove Creek watersheds could result in approximately one-half inch increase in flooding depth in the lower (western) watershed during the 100-year flood and that existing flooding problems in the western portion of the watershed would not be significantly reduced, even if all existing development could be removed from the watershed (CH2M Hill, 1993).

Land use projections based on General and Specific Plans in Placer County show the area developing in the future to be approximately 10 percent impervious surface. Based upon HEC-1 modeling, the CH2M Hill analysis determined that the change in watershed land use from existing conditions to future conditions would result in approximately a 0.12-foot increase in flood stage upstream of the Cross Canal during the 24-hour 100-year storm. The corresponding increase for the 8-day 100-year storm would be approximately 0.08 feet.

12.1.2 Water Quality

Surface Water

The project site is currently classified as agricultural and has most recently been used as grazing range for cattle. Vegetation consists predominantly of annual grasses and oak trees, with some wetlands plant species in the existing wetlands area at the northwest end of the project site.

Storm runoff originating at the project site drains to four major surface water channels: the Auburn Ravine, Ingram Slough and Dutch Ravine (both tributary to Auburn Ravine), and Clover Valley Creek (GW Consulting Engineers, 1998b). These surface waters are tributary to the Sacramento River via the Auburn Ravine and Dry Creek watersheds. Key beneficial uses of the receiving waters are designated as municipal and domestic supply; agricultural supply, recreation, freshwater habitat (Central Valley RWQCB, 1998).

There is no site-specific surface water quality data available. Surface water quality in local streams which would receive runoff from the proposed project is generally considered to be good, with the exceptions of stream reaches receiving runoff from developed areas and highways (EIP Associates, 1997). Based on recent use at the project site and the existing erosion potential (as discussed in Section 10.1.5), the quality of runoff originating on the project site is estimated to be characterized by elevated concentrations of sediment; oxygen-demanding compounds; nitrogenous compounds; coliform bacteria from animal waste; other salts; and/or naturally occurring metals (U.S. EPA, 1983). The estimated runoff concentrations for these constituents are summarized in Table 12-1.

Table 12-1
Runoff Water Quality Estimate (Existing Conditions)

Constituent	Estimated Runoff Concentration[1]
Total Suspended Solids	70 mg/L
Biological Oxygen Demand	n/a
Chemical Oxygen Demand	40 mg/L
Total Kjeldahl Nitrogen	0.965 mg/L
Fecal Coliform Bacteria	1,000 MPN/100 mL (cold weather) 21,000 MPN/100 mL (warm weather)
Pesticides (sum of detected compounds)	0.0002 to 0.02 mg/L
Cadmium	0.001 to 0.014 mg/L
Chromium	0.001 to 0.190 mg/L
Copper	n/a
Lead	0.03 mg/L
Nickel	0.001 to 0.182 mg/L

Notes:
[1] Median EMC for open space (U.S. EPA, 1983)
n/a Data not available

Groundwater

The study area is located within the Sacramento Valley Groundwater Basin as defined by the California Department of Water Resources. The groundwater basin extends from approximately Red Bluff to the Sacramento-San Joaquin Delta, and occupies approximately 9,000 square miles in surface area. Several distinct water-bearing layers and aquifers are within the basin, ranging in depth from 20 to 600 feet below ground surface. Groundwater can also occur as shallow or perched water tables within a few feet of the surface where bedrock is close to the surface. Such perched groundwater conditions likely occur seasonally in portions of the project site.

Recharge of the Sacramento Valley Groundwater Basin occurs through infiltration of streamflow that originates in the mountain areas contiguous to the basin, and by deep percolation of precipitation where soil and geologic conditions are favorable.

Groundwater availability in Central Placer County is variable, with some areas experiencing good production and others not supportive of domestic wells. Groundwater quality data for the vicinity of the project site is limited; however, the project site lies in an area where nitrate impacts may be present due to past regional agricultural activities and/or septic systems. Relatively high levels of iron and manganese may also be encountered (Crawford, Multari, & Starr, 1994b).

As discussed in Section 10.1, most of the upper surface of Boulder Ridge is covered by a cemented volcanic mudflow caprock which exhibits relatively low permeability. This is underlain by the Mehrten formation consisting of conglomerate and breccia. Below the Mehrten Formation is granitic rock exhibiting varying degrees of weathering. Based on this stratigraphy and the types of soils present on the ridge (Group D soils and some Group C soils), groundwater recharge potential for this part of the project site is low, and groundwater is expected to be encountered primarily in weathered granite or fractures within the granitic bedrock. However, seasonal springs have been observed along the slopes of the main ridge, likely due to infiltration through localized fissures in the cap rock and the underlying Mehrten

formation. Although groundwater recharge areas are limited in the area of the project site, local stream channels represent one of the most important potential groundwater recharge zones in the vicinity of the project site (EIP Associates, 1997).

The northwest lowland portion of the project site is characterized by alluvial deposits 5 to 10 feet thick underlain by weathered granitic bedrock. During the preliminary geotechnical investigation, groundwater was encountered at depths of 3 to 10 feet below the existing ground surface in this area (Wallace Kuhl & Associates, 1998). Depth to groundwater on Boulder ridge is unknown.

One groundwater well is known to exist within the NAPOTS parcel. This is a hand dug well of unknown depth located within one of the buildings in the ranch headquarters area in the northwest portion of the project site. Groundwater was observed in this well at a depth of 18 feet below ground surface (PEM, 1996a). Limited testing of one groundwater sample from that well indicates that the groundwater in the immediate area of that well has not been degraded by past activities (PEM, 1996a). Although no other site-specific groundwater quality data were available, the site geology, hydrogeology, and previous land uses suggest that no significant groundwater impacts currently exist at the project site.

12.2 REGULATORY SETTING

Placer County's General Plan contains policies governing development within Placer County. The policies relating to hydrology and water quality are identified in the General Plan Consistency discussion in Section 12.3. Other applicable policies are described below.

12.2.1 Surface Water Hydrology

The U.S. Army Corps of Engineers (Corps) regulates the placement of fill or dredged materials that affect waters of the United States, which include stream courses and jurisdictional wetlands. The Corps regulates these activities under the authority of Section 404 of the Clean Water Act. The Corps would regulate any development in the study area that affect jurisdictional wetlands.

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations based on U.S. Army Corps of Engineers studies. FEMA is also responsible for distributing the Flood Insurance Rate Maps, which are used in the National Flood Insurance Program. Participation in the NFIP provides an opportunity for property owners in the community to purchase flood insurance that is made available, provided that the community complies with FEMA requirements for maintaining flood protection and managing development in the floodplain. The project site falls outside the limits of the 100-year floodplain as delineated on Flood Insurance Rate Maps for Auburn Ravine and Dry Creek.

The Placer County Flood Control and Water Conservation District (FCWCD) formulates regional strategies for flood control management. In the FCWCD Stormwater Management Manual, policy, guidelines, and specific development criteria are presented for stormwater management. The main objective of the FCWCD is to reduce the effects of flooding through best management practices. The manual addresses the following elements which must be included in a stormwater management project:

- Drainage structure design - The storm drainage shall be planned and designed so that no damages occur to structures or improvements during the 100-year event and no inundation of private property occurs during the 10-year event;

- Use of detention basins to maintain downstream flow rates at less than the pre-development rate of flow;
- Floodplain Management Plan;
- System Monitoring Program; and,
- Operations and Maintenance Program

12.2.2 Water Quality

Surface Water

State and Federal Requirements

Surface water quality is regulated by the National Pollutant Discharge Elimination System (NPDES), developed by the U.S. EPA in accordance with Section 303 of the Clean Water Act. In the State of California, the NPDES program is administered by the State Water Resources Control Board (SWRCB), with implementation and enforcement by the Regional Water Quality Control Board (RWQCB). The NPDES program, designed to protect surface water quality, is applicable to all discharges to waters of the United States, including storm water discharges associated with municipal drainage systems, construction activities, industrial operations, and "point sources" (such as wastewater treatment plant discharges and other direct discharges to water bodies). Placer County currently is below the mandated population threshold, and therefore does not have an NPDES permit covering runoff discharges from County-owned facilities, residential areas, or commercial developments. However, it is expected that by 2010, the County will be required to obtain an NPDES permit and develop a Countywide Storm Water Management Plan (Crawford Multari, & Starr, 1994a). In general, the NPDES permit program focuses on controlling, minimizing, or reducing surface water impacts.

Additionally, NPDES permits are issued by the Central Valley RWQCB for construction activities involving disturbance of five acres or more. The conditions of the State's General Permit for Storm Water Discharges associated with Construction Activities require development and implementation of a Storm Water Pollution Prevention Plan that must address the following:

- Plans for implementation of structural and operational Best Management Practices (BMPs) to prevent and control impacts to surface water;
- Inspection and maintenance of BMPs throughout all phases of construction;
- Monitoring of runoff quality during all phase of construction; and
- A plan for preventing and controlling post-construction impacts to runoff quality.

Prior to August 1997, the Central Valley RWQCB had published numerical water quality criteria in the Inland Surface Waters Plan. However, this plan was repealed on a legal challenge, and the U.S. EPA proposes to promulgate water quality criteria for California's inland surface waters based on the National Ambient Water Quality Criteria (Central Valley RWQCB, 1998). These criteria are therefore used to determine the significance of surface water quality impacts potentially arising from the proposed project. Criteria for selected constituents are summarized in Table 12-2.

Table 12-2
National Ambient Water Quality Criteria

Constituent	Concentration (mg/L)
Total Suspended Solids	n/a
Biological Oxygen Demand	n/a
Chemical Oxygen Demand	n/a
Nitrate	10 mg/L
Coliform Bacteria	n/a
Pesticides	varies by compound
Cadmium[1]	0.0035 mg/L maximum
Chromium	n/a
Copper[1]	0.017 mg/L maximum
Lead[1]	0.065 mg/L maximum
Nickel[1]	1.4 mg/L maximum

Notes:
[1] Varies as a function of receiving water hardness; hardness assumed to be 100 mg/L as $CaCO_3$.
n/a None promulgated

Other permits related to protection of surface water quality include the Streambed Alteration Agreement issued by the California Department of Fish and Game and the Section 404 (Nationwide) Permit issued by the U.S. Army Corps of Engineers.

Water quality objectives have also been established for the Sacramento River (and its tributaries), and are contained in the Water Quality Control Plan (Basin Plan, 3rd edition, 1994) for the Sacramento River and San Joaquin Rivers prepared by the Central Valley RWQCB in compliance with the federal CWA and the State Porter-Cologne Water Quality Control Act. The Basin Plan establishes water quality objectives, and implementation programs to meet stated objectives and to protect the beneficial uses of water in the Sacramento River Watershed basin.

Groundwater

State and Federal Requirements

The SWRCB also regulates activities that could results in adverse impacts to groundwater quality. Policies and regulations promulgated by the SWRCB (either under its Clean Water Act authority or state-derived authority) are implemented and enforced by the RWQCB. Groundwater-related activities governed by NPDES permits or waste discharge requirements issued by the RWQCB include aquifer reinjection; reclaimed water irrigation; and siting and design of waste management facilities (including wastewater treatment plants). The RWQCB also oversees local implementation of underground storage tank management programs and other programs related to prevention and control of groundwater impacts.

In general, SWRCB policy prohibits degradation of groundwater quality, and in cases where impacts occur, the RWQCBs typically require restoration of impacted aquifers such that residual concentrations do not exceed the U.S. EPA's Maximum Concentration Limits for drinking water. In cases where the aquifer is hydraulically connected to a surface water body, fresh water aquatic habitat water quality criteria may be imposed as cleanup levels (as summarized in Table 12-2, above).

12.3 IMPACTS

This section discusses and identifies the environmental impacts resulting from the proposed project, and suggests mitigation measures to reduce the level of impact. A detailed discussion of mitigation measures is included in Section 12.4.

Potential significant impacts associated with hydrology and water quality impacts have been evaluated using the following criteria:

- Increase in rate of runoff downstream of the site;
- Increase in volume of runoff leaving the site;
- Long term and irreversible erosion and sedimentation resulting from site development and occupation;
- Failure to meet applicable water quality criteria at any surface water discharge point or in groundwater; and,
- Decrease of groundwater recharge resulting in depressed groundwater levels in the local and/or regional area.

12.3.1 Surface Water Hydrology

IMPACT H-1:	Increase in runoff rate downstream of the site
SIGNIFICANCE:	Potentially Significant
MITIGATION	
Proposed:	Mitigation Measures H-A (Prepare and implement a post-development stormwater management program); and H-B (Provide runoff rate control)
Recommended:	None
RESIDUAL SIGNIFICANCE:	Less Than Significant

A post-development stormwater management program will be developed within the guidelines of the Placer County Storm Water Management Manual. The management program will be consistent with the following goals:

1. Provide protection from periodic inundation which could result in loss of life and property.
2. Protect and enhance natural resources belonging to the stream environment.
3. Prevent significant erosion and adverse effects on water quality.
4. Provide a regional approach to stormwater management which is both internally consistent and consistent with other community goals and plans.
5. Achieve maximum use of resources through multiple compatible uses.
6. Assure orderly growth and development and minimize its adverse effects.

The proposed project includes storm drain improvements within each subdivision. All structures will be designed in accordance with the Storm Water Management Manual. Detention facilities are proposed to meet the Storm Water Management Manual detention requirements of reducing runoff (from the site) to less than the pre-development runoff rate. The proposed facilities include ravine detention ponds, excavated detention ponds and lakes.

The ravine detention ponds will be constructed by installing berms across ravines to restrict the flow. The berm will have a low flow outlet and a high flow spillway. These ponds will be normally dry. The excavated detention ponds function similarly as the ravine detention ponds with low flow outlets and high flow spillways. These structures will also be normally dry but will be constructed by excavating soil to

create detention storage. The Lakes will be constructed in the north west portion of the site in the Meadows area. The lakes will have low flow outlets for the base flow rate fed by water taken from the Caperton Canal and a high flow outlet for storm flows. Lakes will normally be full to a design level with sufficient freeboard to accommodate storm runoff. Table 12-3 identifies the proposed detention basin or lake location, size and performance characteristics.

Table 12-3
Auburn Ravine Proposed Detention Basins and Lakes

Detention Basin or Lake Location (alternative description)	Peak Stage (estimated no sediment)	Estimated Peak Outflow (cfs)	Estimated 100-Year Required Flood Storage	Estimated Maximum Available Capacity (acre feet)	Estimated Reserve Capacity (acre feet)
14BDET	473.7	145	3.5	6.2	2.7
SC-4 (Culvert @ 14B-3)	351.2	231	3.2	ND	ND
AR2-3B (AR2DET)	605.25	123	1.4	2.6	1.2
AR3-3 (AR3DET)	571.3	232	3.5	4.0	0.5
AR4-4 Existing Lake (EXP1)	501.3	228	12.0	ND	ND
AR4-8 (AR4-west)	409.0	280	1.8	2.3	0.5
AR6-5D (AR6-west)	463.2	259	1.0	1.7	0.7
AR6-10 (Lake 'C')	274	620	7.0 (20)	10.9 (23.9)	3.9
AR6-10 (Lake 'B')	270.1	618	1.2 (2.0)	2.4 (3.2)	1.2
AR6-10 (Lake 'A')	266.1	630	4.6 (11.7)	7.6 (14.7)	3.0
AR7-2 (Lake 'C')	346.3	196	2.0 (3.5)	3.9 (5.4)	1.9
AR7-2 (Lake 'B')	333.3	206	1.2 (7.2)	2.8 (8.8)	1.6
AR7-2 (Lake 'A')	322.3	218	1.2 (4.2)	2.5 (5.5)	1.3
AR7-5 (Lake)	302.3	113	10.0 (49)	28 (67)	18
AR7-7 (Lake)	296.4	120	5.0 (33)	13.8 (41.8)	8.8
SC-2 Sierra College Culvert at AR7-8	279.3	123	ND	ND	ND
SC-3 Sierra College Culvert at AR7A-1	306.8	33	ND	ND	ND

*Lake detention volumes are shown and total storage volumes at 100-year level are included in ( ).
ND = not determined
Source: Civil Solutions, 1999a, 1999b

With the development and implementation of a Stormwater Management Plan (SWMP) to provide for post-development stormwater management and the construction of detention structures to reduce the peak flow to less than the existing flow rate, the impact of the proposed project on runoff rate would be reduced to a level that is less than significant.

IMPACT H-2:	Increase in runoff volume leaving the site
SIGNIFICANCE:	Potentially Significant
MITIGATION	
Proposed:	Mitigation Measure H-C (Provide retention storage)
Recommended:	None
RESIDUAL SIGNIFICANCE:	Less Than Significant

The proposed project will result in an increase in the volume of runoff leaving the site. Development of roads, buildings, driveways and other paved and impermeable surfaces will reduce the amount of storm water that infiltrates into the ground and will increase the amount of water that runs off of the site. Runoff will be routed through detention storage facilities that will reduce the rate of runoff from the site but these facilities will not reduce the volume of runoff flowing from the site. Under existing conditions it is estimated that the site will generate 1,285 acre-feet of runoff during a 100-year, 8 day duration storm. After development of the site, it is estimated that the 100-year, 8 day duration storm would generate 1,419 acre-feet of runoff. Therefore, after development of the project, there would be an additional 134 acre-feet of runoff flowing from the site. Of this total increase, 108 acre-feet would flow to the Auburn Ravine watershed and into Sutter County. The balance, 26 acre-feet, would flow into Clover Valley Creek and subsequently into Dry Creek.

Within the Dry Creek watershed, the most extensive flood damage occurs in areas along Miners Ravine in the vicinity of Joe Rodgers Road and upstream of Sierra College Boulevard; Paragon Court near Antelope Creek in Rocklin; areas along Cirby, Linda and Dry Creek in Roseville; and along Dry Creek in Rio Linda. Sacramento and Placer counties jointly sponsored the preparation of the Dry Creek Watershed Flood Control Plan (J.M. Montgomery, 1992). The plan recommends:

- Regional storm water detention basins;
- Channel improvements, levees and floodwalls;
- Bridge and culvert replacement;
- Local, on-site detention (in the upper two-thirds of the watershed only);
- Floodplain management;
- Regional flood warning and data collection; and,
- Collection of fees from new developments and establishment of assessment districts for flood control facilities.

The plan recommendations are in various stages of implementation as part of a regional approach to managing flood flows within the Dry Creek watershed. The proposed project is being implemented in a manner that is consistent with the recommendations of the Dry Creek Watershed Flood Control Plan and in conformance with the Placer County Storm Water Management Manual. Therefore, an increase in runoff volume due to development of that part of the proposed project lying with the Dry Creek Watershed is not considered to be a significant impact.

Sutter County also has a history of flooding and flood related damage. In response, Placer and Sutter counties have studied and attempted to identify appropriate measures to mitigate increased runoff volume associated with development in Placer and Sutter counties. These studies include the Auburn Ravine watershed which originates in Placer County just west of the City of Auburn. Auburn Ravine receives runoff from developed and undeveloped areas, which includes the project site, and conveys that runoff into Sutter County. Because of the nature and extent of flooding within Sutter County, any increase in runoff volume entering the County would be considered a significant impact. Without mitigation, the proposed project would result in an increase in runoff volume that would flow into Sutter County and would therefore have a significant affect on flooding within the County. However, the Applicant has entered into formal communications with the City of Lincoln regarding participation in the City's Master

Drainage Plan retention basin, which is currently in the preliminary planning and site acquisition phase. Implementation of the basin probably will not occur for several years and depends upon the build-out schedule of other development projects previously approved by the City (Campbell, 1999). The City has indicated its conditional agreement to accommodate an increased storage capacity at this basin, pending receipt and concurrence with supporting technical analyses demonstrating overall feasibility of the concept and execution of construction and maintenance cost sharing agreements (Pedri, 1999). With construction of this basin, sized to accommodate an additional 108 acre-feet of storage (the incremental increase in runoff volume emanating from the proposed project), the impact of the proposed project due to increased runoff volume would be reduced to a level that is less than significant. However, there is uncertainty with regard to the implementation schedule, the feasibility of increasing the basin size and final agreement on economic considerations. As an interim solution, the Applicant is proposing to provide on-site storage and limitation of site development until the City's retention pond is in place. Table 12-4 describes the buildout phase storage requirements by major drainage basin (shed name). With the proposed measures, this impact would be less than significant.

Table 12-4
Retention Volumes by Phase

Runoff Shed Name	Phase I	Phase II	Phase III	Total
Ingram Slough	16	4	0	20
AR1	0	0	0	0
AR2	0	0	13	13
AR3	0	0	12	12
AR4	5	3	1	9
AR5	8	2	0	10
AR6	9	5	0	14
AR7	30	0	0	30
Total by Phase	68	14	26	108

Source: Civil Solutions, 1999a, 1999b

On-site retention would be accomplished by increasing the holding capacity of all detention facilities and on-site lakes. This increase in holding capacity would require annual maintenance and operation to draw all residual water surfaces down to a predetermined level prior to each storm season.

Volume calculations show that Phase I of Bickford Ranch (68 acre feet of required retention) could be accommodated in the lakes in The Meadows area with a ±10-foot drawdown. Phase II and Phase III could be accommodated in the remaining on-site detention/retention areas and additional drawdown of the lakes.

12.3.2 Water Quality

Surface Water

As discussed in Section 12.1, the project site comprises a total of 18 drainage sub-basins, and the proposed project would increase the overall amount of impervious surface, thereby increasing runoff from most of these areas. Following construction of the proposed project, storm water runoff quality can be expected to decline as more potential pollutants will be generated by the activities of man. Additionally, pollutants will tend to be flushed from impervious surfaces where they accumulate (i.e., paving and roofs) into drainage conveyances. Key constituents in typical urban runoff are similar to those present prior to

construction, but metals concentrations would typically be expected to be higher, and the development would introduce new pollutants to surface water such as oils, grease, pesticides and chemical fertilizers. Table 12-5 summarizes the estimated runoff quality for the post-construction period, assuming no preventative practices or controls are implemented.

Table 12-5
Runoff Water Quality Estimate
(Post-Construction, No Pollution Prevention Measures)

Constituent	Estimated Runoff Concentration[1]
Total Suspended Solids	70 to 100 mg/L
Biological Oxygen Demand	9 to 10 mg/L
Chemical Oxygen Demand	57 to 73 mg/L
Total Kjeldahl Nitrogen	1.2 to 1.9 mg/L
Fecal Coliform Bacteria	1,000 MPN/100 mL (cold weather) 21,000 MPN/100 mL (warm weather)
Pesticides	significant increase
Cadmium	0.001 to 0.014 mg/L
Chromium	0.001 to 0.190 mg/L
Copper	0.029 to 0.033 mg/L
Lead	0.1 to 0.14 mg/L
Nickel	0.001 to 0.182 mg/L

Note:
[1] Range of Median EMCs for roads, residential, and commercial areas (U.S. EPA, 1983)

BMPs are frequently implemented by municipalities, industries, and other storm water dischargers. BMPs can be structural (permanent engineered features such as treatment systems and sedimentation basins) or operational (so-called "good housekeeping" principles implemented to minimize accumulation of potential pollutants in soil or on impervious surfaces). The SWRCB, along with local agencies, has developed standard BMP manuals consisting of conceptual designs for structural BMPs, "good housekeeping" principles for a wide variety of industries, and public participation/information programs designed to prevent and minimize storm water pollution. Maximizing the use of cost-effective BMPs is the most effective means of controlling these potential impacts.

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IMPACT H-3: Reduced storm water quality due to increased erosion and sedimentation during construction

SIGNIFICANCE: Potentially Significant (short-term)

MITIGATION

Proposed: Mitigation Measures G-B (Prepare and implement a grading and erosion control plan); H-D (Prepare and implement a Storm Water Pollution Prevention Plan for construction activities); and H-E (Monitor erosion and sediment control measures during construction)

Recommended: None

RESIDUAL SIGNIFICANCE: Less Than Significant

The mass grading involved in preparing the project site for construction would result in a temporary decrease in vegetative cover. Loss of vegetation tends to increase the potential for soil erosion which could cause an increase in suspended solids in runoff and local receiving waters. Areas denuded during construction could continue to erode indefinitely following completion of construction if no steps were taken to prevent or control erosion and sedimentation. The Applicant plans to prepare an erosion control plan in accordance with Placer County's grading ordinance (Mitigation Measure G-A) and will apply for an NPDES General Permit for Discharge of Storm Water Associated with Construction Activities. In order to obtain the NPDES permit, the Applicant must also prepare a project-specific Storm Water Pollution Prevention Plan (SWPPP) (Mitigation Measure H-D). The erosion control plan and the SWPPP should contain a description of all earthwork activities by phase, a detailed construction schedule (updated frequently as the work progresses), identification of activities that may cause runoff quality impacts, and specific measures to control erosion and minimize sediment discharges in runoff during each phase of buildout. Typical erosion and sedimentation control measures should include, but may not be limited to:

- Use of erosion control mats on cut and fill slopes;
- Revegetating denuded areas, particularly slopes, as soon as practical using hydroseeding or other suitable techniques;
- Erection of silt fences at the toe of denuded slopes until vegetation is fully established;
- Construction of temporary or permanent runoff control berms or diversion ditches to reduce sheet flow across vulnerable areas and/or capture sediment –laden runoff;
- Construction of temporary sedimentation basins upgradient of discharge points;
- Installation of silt fences, hay bales, or filter bags at catch basins receiving runoff from denuded areas;
- Frequent inspection and maintenance of these structural BMPs, with particular attention to "winterizing" the project site each year by the end of September and inspecting and repairing EMPs prior to and after each rainfall event.

The SWPPP should also include definition of parties responsible for implementing the plan. It is not certain that the standard SWPPQ elements would reduce impacts to a less than significant level. Therefore, in addition to the required visual inspection of runoff at selected monitoring points, the SWPPP will include a plan for sampling and analysis of runoff at selected discharge points (Mitigation Measure H-E). Samples should be analyzed for Total Suspended Solids (TSS) during several storm events each year. If TSS exceeds the water quality goal or other limits imposed by the NPDES permit, immediate steps should be taken to identify and remedy the problem. Because of the planned construction phasing, monitoring points may vary from year to year, and the SWPPP should be updated each year at the end of the rainy season.

Implementation of the proposed mitigation measures would reduce the impact to less than significant.

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IMPACT H-4:	Reduced storm water chemical quality due to construction activities
SIGNIFICANCE:	Potentially Significant (short-term)
MITIGATION	
Proposed:	Mitigation Measure H-D (Prepare and implement a Storm Water Pollution Prevention Plan for construction activities)
Recommended:	None
RESIDUAL SIGNIFICANCE:	Less Than Significant

Impacts to runoff water quality during construction could potentially result from leaks or spills of fuel or hydraulic fluid used in construction equipment; outdoor storage of construction materials; or spills of paints, solvents, and other potentially hazardous materials commonly used in construction. The SWPPP (Mitigation Measure H-D) should include a project-specific plan for preventing this type of impact through the use of structural and/or operational BMPs. The following measures should be considered for inclusion in the SWPPP:

- Scheduling materials deliveries to provide for minimal on-site storage and/or providing covered storage for materials wherever practical;
- Designating specific areas for overnight equipment storage and maintenance and providing runoff control around those areas to minimize the potential for runoff to contact spilled materials;
- Procedures for daily work site cleanup and immediate cleanup of spilled materials and contaminated soil;
- A program of site inspections to ensure that BMPs are consistently implemented and effective; and
- Visual monitoring of runoff quality at selected monitoring points;

As discussed above, the SWPPP should be updated as frequently as necessary to ensure that all construction activities are considered, as well as the season and the phase of the project. Implementation of an SWPPP developed in accordance with the requirements of the NPDES permit program would reduce these impacts to less than significant.

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IMPACT H-5:	Increased erosion and sedimentation after buildout
SIGNIFICANCE:	Potentially Significant
MITIGATION	
Proposed:	Mitigation Measures G-B (Prepare and implement a grading and erosion control plan); H-A (Prepare and implement a post-development stormwater management program); H-F (Monitor site erosion and sediment control measures for two years after implementation of final erosion control measures); and H-G (Design runoff detention basins to promote solids settling and provide capacity for accumulated sediment)
Recommended:	None
RESIDUAL SIGNIFICANCE:	Less Than Significant

If erosion control measures implemented during and immediately after construction are not properly maintained until vegetative cover is fully established, soil erosion could occur, potentially causing increased sediment loading in runoff. The erosion control plan (Mitigation Measure G-B) should include a detailed plan for revegetation of denuded areas, particularly slopes in vulnerable soil types, and provide a mechanism for maintenance (irrigation, fertilization, and/or periodic replacement) until the vegetation is established to the point where it provides erosion protection equal or superior to that which existed prior to construction.

A post-development stormwater management program should also be developed in accordance with NPDES requirements for municipal storm water discharge (Mitigation Measure H-A). The purpose of the program is to document existing storm water management systems, their intended function, operation and maintenance requirements, and parties responsible for implementing functions related to storm water quality management. In addition, the program should include a program of inspection and monitoring to ensure that needed repairs are made as soon as practical and a plan for monitoring suspended solids at key

discharge points for a period of at least two years until erosion has stabilized (Mitigation Measure H-F). Once full revegetation is established, visual monitoring of discharges from the detention basins may be sufficient to ensure adequate performance.

The Applicant plans to construct several runoff retention basins to intercept and control discharges into major drainage channels off-site. These basins should be designed to allow adequate retention time for solids settling and adequate volume to accommodate accumulation of sediments (Mitigation Measure H-G). Alternatively, periodic sediment removal may be used to ensure that the hydraulic capacity of the system is not exceeded.

Implementation of a grading and erosion control plan and post-development stormwater management plan will not, by itself, be sufficient to reduce the impact to a less than significant level. The four mitigation measures described above would reduce the residual impact to less than significant.

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IMPACT H-6:	Reduced storm water runoff quality after buildout (excluding sedimentation)
SIGNIFICANCE:	Potentially Significant
MITIGATION	
Proposed:	Mitigation Measures HW-F (Finalize and implement the Applicant's Golf Course Chemical Application Management Plan); H-A (Prepare and implement a post-development stormwater management program); and H-H (Finalize and implement the Applicant's Lake Management Plan for constructed lakes and wetlands areas);
Significance After Proposed Mitigation:	Potentially Significant
Recommended:	Mitigation Measure H-I (Design and construct improvements to protect water quality in canals in accordance with PCWA standards and County requirements for a 100-foot setback from structures)
RESIDUAL SIGNIFICANCE:	Less Than Significant

Following construction of the proposed project, surface water quality in drainage channels, the raw water canals or other surface water bodies could potentially be impacted by reduced runoff water quality due to the following:

- Use of chemical pesticides and fertilizers at the golf course;
- Accumulation of degradable organic compounds in the manmade lakes and wetlands from wildlife fecal material;
- Increased metals and petroleum-based compounds due to the presence of residences and commercial uses at the project site; and
- Increased degradable organic compounds, nitrate, and fecal coliform bacteria from use of the proposed equestrian area and trails.

The Applicant has prepared and submitted a Draft Chemical Application Management Plan for the golf course (Mitigation Measure HW-F) that will detail turf management practices, plans for storage and use of chemicals, methods for controlling potential surface water quality impacts due to runoff contamination and a plan for surface water quality monitoring to document the outcome of the program and provide

information regarding changes to the program that may be needed. The Applicant plans to implement the Plan upon final approval by the County.

The Applicant has prepared a Draft Lake Management Plan to provide for appropriate management of the man-made lake system (Mitigation Measure H-H) and minimize potential surface water impacts due to residential runoff and lake discharges into off-site drainage channels.

The Final Lake Management Plan shall include (but not be limited to) the following items:

1. Section 1 – Project Description of Lakes: Characterize water quality from Caperton Canal; identify expected volume of make-up water; monitor total dissolved solids in make-up water to ensure that it will not adversely affect existing water quality coming from Caperton Canal.

2. Section 2 – Lake Construction: Calculate the estimated seepage rate for the method chosen for sealing lake bottoms, and choose a method (among the alternatives presented in the draft plan) that does not allow high seepage rates. Provide a complete description of lake maintenance infrastructure that will achieve the objectives of the plan.

3. Section 3 – Lake Management: Identify the parties responsible for maintaining the lake management systems. In Section 3.1, describe the nutrient input control and turnover rates necessary to ensure proper maintenance. Finalize the description of the revegetation plan (include additional mid- and low-level species to ensure sufficient habitat during the natural revegetation period; specify recommended flora densities). In Section 3.6, identify soil erosion techniques and implementation procedures to control soil erosion. In Section 3.8, identify management techniques to control aquatic invertebrates and fish species that might become established in the lakes.

4. Section 4 – Recreation: Identify provisions for non-destructive access to the lakes for non-motorized boats.

5. Section 5 – Lake Monitoring: Monitor Lakes Six and Seven for total petroleum as oil, total petroleum as gasoline, and semivolatile organic compounds to ensure that contamination from the road intersecting the two lakes and the associated traffic does not adversely affect water quality, using RWQCB standards. For the first year, collect and analyze one sample per quarter. If no contamination is detected, monitoring activity could be decreased to an annual or semiannual schedule.

   For all lakes, include monitoring for pesticides and herbicides used on the golf course, using RWQCB standards, monthly for the first two years and quarterly for the subsequent three years unless contamination is present at levels indicating that continued monitoring is appropriate.

   For Lakes One, Two, and Three, monitor for contamination that might result from activities on this property, such as leakage from the septic tank and sediment accumulations due to erosion.

6. Section 6 – Water Quality Corrective Actions: Develop a corrective action threshold above 5 mg/L for dissolved oxygen in order to ensure that the health of lake biota is not jeopardized by a sudden decrease in dissolved oxygen levels. Identify corrective action for contamination resulting from runoff from the road, from chemical usage, and from activities on the NAPOTS property affecting lake water (if any).

7. Section 7 – Corrective Action Management Alternatives to Common Problems: Delete full draw down or the use of dyes as two alternative methods for managing nuisance aquatic vegetation. Revise Section 7.2 regarding muddy water to identify the cause(s) of the turbidity and implement a management strategy to ensure its reduction, rather than treating the effects. Identify appropriate fishing seasons for each species of game fish identified in Section 7.3.

The Applicant plans to implement the Plan upon final approval by the County.

The post-development storm water management program (Mitigation Measure (H-A) should also address potential chemical impacts to surface waters, and should include the following:

- A description of all runoff management systems and their function (including conveyance and treatment systems);
- A description of operations and routine maintenance for each system;
- Specific programs that relate to controlling storm water pollution (street sweeping, waste collection, community education/awareness, lake management, golf course management, and maintenance of equestrian areas); and
- Definition of parties responsible for inspection, operation, and upkeep of each system and implementation of each program.

The SWMP is essentially a master document which considers all potential sources and causes of surface water impacts (including the golf course and lakes), whereas the Chemical Application Management Plan and Lake Management Plan are focused plans intended for use by the individual system managers. In addition, it is recommended that the Applicant provide for a 100-foot setback from canals, and design and construct runoff controls or other engineered means to prevent contaminated runoff from entering Caperton and Antelope canals (Mitigation Measure H-I). These controls must be designed and constructed in accordance with PCWA's Improvement Standards unless a variance is approved by PCWA for alternate water quality protection measures. In combination, these four mitigation measures will reduce the level of impact to less than significant.

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Groundwater

Groundwater impacts often occur or are detected several years after the event or activity that causes them. In general, residential development does not pose a high risk of groundwater contamination; however, impacts to groundwater could potentially result from the following activities related to the proposed project:

- Use of chemical fertilizers and pesticides at the golf course;
- Accumulation of degradable organic compounds in manmade lakes and wetlands from wildlife fecal material;
- Failure of septic leach field systems; and
- Leakage from on- and off-site sanitary sewer pipes.

IMPACT H-7: Reduced groundwater quality
SIGNIFICANCE: Potentially Significant
MITIGATION
Proposed: Mitigation Measures HW-F (Finalize and implement the Applicant's Golf Course Chemical Application Management Plan); H-H (Finalize and implement the Applicant's Lake

Management Plan for constructed lakes and wetland areas); H-J (Implement Placer County policies and ordinances related to permitting, design, construction, and maintenance of septic systems); and H-K (Notify Placer County Department of Environmental Health and affected property owners if off-site sewer pipeline breaks)

Recommended: None

RESIDUAL SIGNIFICANCE: Less Than Significant

Golf Course

Approximately 35 acres of the proposed golf course would drain to the Auburn Ravine sub-basin, and approximately 84 acres would drain to the Clover Valley Creek sub-basin. Overall runoff quantities generated from these areas would be low relative to other proposed land uses at the project site and would be similar to the current condition. The majority of runoff from irrigated areas of the golf course would drain by sheet flow to existing natural channels, and the potential for on-site infiltration is limited by the soil types present in the proposed golf course area. Existing creeks which would receive runoff from the golf course (Auburn Ravine Creek and Clover Valley Creek) are groundwater recharge sources, and significant impacts to runoff quality could therefore potentially reduce groundwater quality within the creek recharge zones. Because of the need to maintain large areas of high-quality turf grass, golf courses typically use relatively large quantities of chemical fertilizers, pesticides, herbicides and fungicides. In recent years, more golf courses have implemented less chemical-intensive methods by selecting climate-adapted grass species and using integrated pest management techniques. The Applicant plans to utilize these approaches to minimize the need for chemical application and will finalize its Chemical Application Management Plan (Mitigation Measure HW-F) detailing procedures to control and minimize potential surface water impacts from golf course runoff. In addition, the Applicant plans to monitor the quality of golf course runoff in accordance with the Chemical Application Management Plan. The proposed mitigation would thereby reduce the potential for groundwater quality impacts in creek recharge areas to less than significant.

Man Made Lakes

The proposed man-made lakes designed as an amenity for the northwestern portion of the project site may be attractive to wildlife, and residents may introduce waterfowl or fish. The Applicant proposes to design the lakes as a natural ecosystem with appropriate plant species. If the population of wildlife were to exceed the biodegradation capacity of the system, nitrates and related animal waste constituents could infiltrate into the relatively shallow water table aquifer below the lakes area. Residential runoff generated upgradient of the lakes areas would drain by sheet and open channel flow to the existing wetlands (similar to current conditions). Runoff from these areas would pass through a natural open space area prior to discharge in the wetlands area. Vegetation in the open space area would tend to act as a filter, slowing sheet flow velocities and allowing settling of suspended solids including metallic particulates. Under low flow runoff conditions, runoff would bypass the man-made lakes; however, during high flow conditions, runoff would be discharged into the lakes. Due to the presence of plants and naturally occurring microbes, both the wetlands and the lakes are capable of acting as a biofilter to degrade organic runoff constituents. The Applicant has prepared a Draft Lake Management Plan (Mitigation Measure H-H) that would include specific plans for vegetation types and densities that will support and promote long-term health of the system while minimizing the need for maintenance. The final plan would also address maintenance requirements, present a monitoring program to ensure that the system continues to function as designed following project buildout, and identify parties responsible for maintaining the system. This mitigation measure would reduce potential groundwater quality impacts to less than significant.

Individual Septic Systems

A total of 18 residential parcels would have individual septic tank and leach field systems for disposal of wastewater. Failure of leach field systems could result from poor design and/or maintenance and could potentially result in groundwater impacts. It is therefore Placer County's policy to require that septic systems be maintained by a public entity (Policy 4.D.9) and the Placer County Environment Services Department enforces permitting and septic system design standards to protect public health and groundwater quality. Each of the septic systems would be permitted separately after submittal of site-specific tests demonstrating that minimum criteria can be satisfied. The Applicant has completed the required soil percolation testing for all of the affected parcels and proposes to complete septic system design for each parcel based on site-specific data and Placer County's design requirements. Due to the relatively low permeability of the cap rock and Mehrten conglomerate, special sand filter systems will be needed to provide adequate leach field capacity for eight of these parcels (Aqua-Terra, 1999). Complete implementation of Placer County policies and ordinances relating to property setbacks, septic system permitting, design, construction and maintenance is proposed (Mitigation Measure H-J), and would reduce the impact to less than significant.

Sanitary Sewers

Sanitary sewers can develop leaks due to material permeability properties, joint separation, cracking, crushing or differential settlement. The most serious problem associated with sewer leakage is groundwater impacts from nitrates and/or coliform bacteria in cases where site-specific geology, hydrogeology, and sewer condition are less than optimal. Most significant sewer leakage problems tend to be a consequence of age, but poorly constructed sewers can leak from the outset. Existing and proposed wells located near the proposed on- and off-site sewer pipelines could therefore potentially be impacted. The California Department of Water Resources has developed water well standards (DWR, 1991) which require that domestic supply wells be located at least 50 feet from sanitary sewers underlain by unsaturated soil exhibiting relatively low permeability. Proposed on-site wells would be constructed in accordance with DWR standards, thereby reducing the level of impact to less than significant. It is uncertain at this time whether any domestic supply wells exist in close proximity to the proposed off-site sewer alignment. Proposed mitigation for potential groundwater impacts from off-site sewers (Mitigation Measure H-K) include notifying Placer County Department of Environmental Health and property owners with wells within 50 feet of the sewer line, and providing compensation for impacts to wells related to the breakage. Groundwater in the vicinity of the proposed off-site sewer may already have nitrate impacts due to agricultural land use and/or septic systems, and determination of baseline coliform and nitrate levels prior to sewer construction is therefore suggested, but not mandatory. The recommended mitigation would reduce the level of impact to less than significant.

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IMPACT H-8: Loss of groundwater recharge opportunity
SIGNIFICANCE: Less Than Significant
MITIGATION: None Warranted

Approximately 271 acres of the 1,954.6 acre project site would be developed to accommodate residential, commercial and service uses and interior roadways which would result in the creation of impervious surfaces, thus reducing the potential area available for infiltration to recharge underlying aquifers. However, recharge potential is already limited within the project site. This limitation is due to soil and geologic conditions. Downward migration of water from the surface is inhibited by group D soils over approximately 75 percent of the project site. Due to shallow soil development over nearly impervious material in these areas the creation of impervious surfaces would not significantly alter recharge potential.

These areas include the caprock and upper slopes of the main ridge and the northwest trending ridges, which are underlain by the Exchequer and Inks soils series. These soils have an inherently high runoff potential limiting recharge potential. The areas of the project site underlain by these soils include the Heritage Ridge and Ridges units, which include the higher development density. The remainder of the project site is underlain by Group C soils which are described as having a slow infiltration rate. The project plan for these lower elevation areas of the project site includes lower density development and open areas.

Because the proposed project would not significantly alter recharge potential of the project site for the reasons described above, this impact is considered less than significant.

12.3.3 General Plan Consistency

The Placer County General Plan policies addressing hydrology and water quality are identified below, and a determination of the proposed project's consistency is made. The proposed project is consistent with Placer County's hydrology and water quality policies.

Stormwater Drainage

4.E.1 The County shall encourage the use of natural stormwater drainage systems to preserve and enhance natural features.

Consistent.
The proposed drainage system will utilize existing drainage systems to the extent possible, including the ravines and existing natural channels.

4.E.2 The County shall support efforts to acquire land or obtain easements for drainage and other public uses of floodplains where it is desirable to maintain drainage channels in a natural state.

Consistent.
Large areas of natural open space that contain both natural channels and proposed man-made ponds and lakes will be dedicated as public open space.

4.E.4 The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's *Stormwater Management Manual* and the *County Land Development Manual*.

Consistent.
The proposed project includes the preparation and implementation of a stormwater management program consistent with District standards.

4.E.5 The County shall continue to implement and enforce its *Grading Ordinance* and *Flood Damage Prevention Ordinance*.

Consistent.
A grading plan will be prepared consistent with County Grading Ordinance requirements.

4.E.6 The County shall continue to support the programs and policies of the watershed flood control plans developed by the Flood Control and Water Conservation District.

Consistent.
The proposed project includes the preparation and implementation of a stormwater management program consistent with District standards. In addition, a stormwater monitoring program will be implemented to include gauging stations on major tributaries.

4.E.9 The County shall encourage good soil conservation practices in agricultural and urban areas and carefully examine the impact of proposed urban developments with regard to drainage courses.

Consistent.
Project development includes the provision of grading and erosion control programs.

4.E.10 The County shall strive to improve the quality of runoff from urban and suburban development through use of appropriate and feasible mitigation measures including, but not limited to, artificial wetlands, grassy swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, and other BMPs.

Consistent.
Grading and erosion control programs will be implemented as part of project development. The proposed project includes the preparation and implementation of a stormwater pollution prevention plan for construction phases and a stormwater management program for post-buildout phases. All plans will include appropriate mitigation measures designed to improve urban runoff water quality.

4.E.13 The County shall require that new development conforms with the applicable programs, policies, recommendations, and plans of the Placer County Flood Control and Water Conservation District.

Consistent.
Project development will conform to all applicable Placer County Flood Control and Water Conservation District standards.

4.E.14 The County shall require projects that have significant impacts on the quantity and quality of surface water runoff to allocate land as necessary for the purpose of detaining post-project flows and/or for the incorporation of mitigation measures for water quality impacts related to urban runoff.

Consistent.
The proposed project includes the preparation and implementation of a stormwater pollution prevention plan for construction phases and a stormwater management program for post-buildout phases. Detention facilities and monitoring stations are proposed.

4.E.17 The County shall, wherever feasible, require that proponents of new projects encase, or otherwise protect from contamination, domestic water supply canals where they pass through developments with lot sizes of 2.3 acres or less; where subdivision roads are constructed within 100 feet upslope or upstream from canals; and within all commercial, industrial, institutional, and multi-family developments.

Consistent.
The project improvements provide for encasement and rerouting of canals on-site where they pass through smaller lot residential areas.

Groundwater

4.D.1. The County shall permit on-site sewage treatment and disposal on parcels where all current regulations can be met and where parcels have the area, soils, and other characteristics that permit such disposal facilities without threatening surface or groundwater quality or posing any other health hazards.

Consistent.
On-site sewage disposal is proposed for several larger lots and the fire station site. On-site sewage disposal and treatment will be provided in conformance with all County ordinances and policies.

4.D.2. The County shall require that the on-site treatment, development, operation, and maintenance of disposal systems complies with the requirements and standards of the County Division of Environmental Health.

Consistent.
On-site sewage disposal and treatment will be provided in conformance with all County ordinances and standards.

6.A.10. The County shall protect groundwater resources from contamination and further overdraft by pursuing the following efforts:

a. Identifying and controlling sources of potential contamination;
b. Protecting important groundwater recharge areas;
c. Encouraging the use of surface water to supply major municipal and industrial consumptive demands;
d. Encouraging the use of treated wastewater for groundwater recharge; and
e. Supporting major consumptive use of groundwater aquifer(s) in the western part of the county only where it can be demonstrated that this use does not exceed safe yield and is appropriately balanced with surface water supply to the same area.

Consistent.
Mitigation measures proposed to protect groundwater include preparation and implementation of a golf course chemical application management plan and a lake management plan. Additionally, recommended mitigation measures implementation of County ordinances related to septic system installation and monitoring existing and proposed domestic water wells near sanitary sewer lines.

Flood Protection

4.F.4. The County shall require evaluation of potential flood hazards prior to approval of development projects. The County shall require proponents of new development to submit accurate topographic and flow characteristics information and depiction of the 100-year floodplain boundaries under fully-developed, unmitigated runoff conditions.

Consistent.
The proposed project includes the preparation and implementation of a stormwater management program consistent with District standards. In addition, a stormwater monitoring program will be implemented to include gauging stations on major tributaries.

Flood Hazards

8.B.5 The County shall coordinate with neighboring jurisdictions to mitigate the impacts of new development in Placer County that could increase or potentially affect runoff onto parcels downstream in a neighboring jurisdiction.

Consistent.
The Applicant is coordinating with the City of Lincoln to use the future City of Lincoln retention basin to control runoff from the site into the Auburn Ravine watershed. The City of Lincoln has indicated that it anticipates that it can accommodate the flows from the proposed project. The Applicant is also discussing with Sutter County the viability of on-site retention. The project Applicant will comply with County policies and programs regarding downstream runoff.

12.4 MITIGATION MEASURES

Mitigation Measure H-A: Prepare and implement a post-development stormwater management program

Mitigation Measure H-A applies to Impacts H-1, H-5, H-6, B-17, B-18, and B-19.

The Applicant proposes to develop a Stormwater Management Program under the guidelines set up by the Placer County Flood Control and Water Conservation District's Stormwater Management Manual. The components of the program include protection from flooding, protection and enhancement of the stream environment, prevention of erosion and adverse water quality, incorporation of regional stormwater management goals, creation of multiple resource use, and assurance of the growth of the project to minimize its adverse impacts.

The purpose of this mitigation measure is to provide a plan for ensuring that structural BMPs constructed as part of the proposed project are maintained appropriately such that they continue to perform their intended function as long as the project site is occupied. Placer County does not have an NPDES permit covering storm water discharges in the county; however, the Placer County General Plan sets forth several policies which function to bring the County into compliance with the substantive requirements of the NPDES program. The Storm Water Management Plan will address site-specific drainage characteristics, storm water conveyance systems, discharge points, potential sources of runoff quality impacts, specific structural BMPs that have been constructed as part of the project, recommended operational BMPs, a maintenance program for structural BMPs, a monitoring program designed to evaluate the need for BMP modifications or additional BMPs, and identification of specific parties responsible for implementing each part of the plan.

Mitigation Measure H-B: Provide runoff rate control

Mitigation Measure H-B applies to Impact H-1.

The Applicant proposes runoff rate control for detaining peak stormwater flows. The proposed project includes detention structures (ravine detention ponds, excavated detention ponds and lakes) to reduce the flow rate during peak storm events to less than the existing flow. This is based on the Placer County Storm Water Management Plan requirements. The structures will be constructed with low flow outlets and high flow spillways in order to catch and detain the peak of the storm and regulate the rate of discharge to the receiving body of water. The structures will be designed to meet the County requirements. Figure 3-21 shows the location of the detention structures for the proposed project.

Mitigation Measure H-C: Provide retention storage

Mitigation Measure H-C applies to Impact H-2.

The Applicant will construct or cause to be constructed 108 acre-feet of retention storage within the Auburn Ravine watershed. The retention storage will be provided either entirely off-site or through a combination of on-site and off-site storage. The Applicant is formally communicating with the City of Lincoln to increase the volume of the City's Master Drainage Plan retention basin to accommodate the increase in runoff volume emanating from the proposed project site. However, additional technical analysis would be required to demonstrate the feasibility of increasing the storage volume of the City's retention basin such that it would accommodate the proposed project runoff volume. In addition, the current schedule for design and construction of the basin extends over a period of several years. Therefore, until off-site retention storage is constructed and available for mitigation of increased runoff volumes emanating from the proposed project site, the Applicant shall, prior to commencement of construction of any phase of the project that discharges runoff into Auburn Ravine, provide technical analysis demonstrating that on-site retention storage is being provided in compliance with the requirements of Sutter and Placer counties.

Mitigation Measure H-D: Prepare and implement a Storm Water Pollution Prevention Plan for construction activities

Mitigation Measure H-D applies to Impacts H-3, H-4, B-8, B-9, B-10, and B-13.

The Applicant proposes to prepare and implement a Storm Water Pollution Prevention Plan. Construction activities involving the disturbance of five or more acres are required to apply for coverage under the SWRCB's NPDES General Permit for Storm Water Discharges Associated with Construction Activities. To obtain coverage under the permit, the Applicant must submit a Notice of Intent with the required permit fee and prepare a SWPPP. The contents of the SWPPP are set forth in detail in the permit application package and include development of site-specific structural and operational BMPs to prevent and control impacts to runoff quality, measures to be implemented before each storm event, inspection and maintenance of BMPs, and monitoring of runoff quality by visual and/or analytical means. The RWQCB will issue Waste Discharge Requirements (WDRs) which set forth conditions, discharge limitations, and monitoring and inspection requirements. Development and implementation of the SWPPP is the responsibility of the Applicant and its assignees.

Mitigation Measure H-E: Monitor erosion and sediment control measures during construction

Mitigation Measure H-E applies to Impacts H-3, B-8, B-9, B-10, and B-13.

The purpose of this mitigation measure is to provide a means of evaluating the effectiveness of erosion control measures and other storm water BMPs. The monitoring will be developed for, and included in, the SWPPP in accordance with the requirements of the NPDES General Permit. The monitoring program will be developed based on anticipated construction methods, sequencing, and schedule, and will be revised as appropriate for each phase of construction and when construction methods or schedule vary significantly from the proposed plan. Monitoring points may change over time as the buildout progresses, but will be selected to be representative of the project site and implemented BMPs as well as areas not protected by BMPs. Emphasis will be placed on monitoring vulnerable areas. All BMPs will be inspected before and after each rainfall and repaired and/or modified as required to control site erosion and trap sediments. Runoff sampling shall be performed during several storm events each year. Sampling should be timed to coincide with storms that generate noticeable runoff and samples shall be quantitatively tested for total suspended sediments. If the measured TSS exceeds the water quality goals

or other limits imposed by the NPDES permit, immediate steps shall be taken to identify and remedy the problem. Monitoring of BMPs and suspended sediment throughout construction is the responsibility of the Applicant and its assignees.

Mitigation Measure H-F: Monitor site erosion and sediment control measures for two years after implementation of final erosion control measures

Mitigation Measure H-F applies to Impacts H-5, B-17, B-18, and B-19.

The purpose of this mitigation measure is to monitor the effectiveness of long-term erosion and sediment control measures. A long-term monitoring program will be developed in accordance with NPDES guidelines and incorporated into the Storm Water Management Plan. Similar to construction phase monitoring (Mitigation Measure H-D), the program will be developed based on actual site drainage characteristics. Monitoring points will include all storm drain outfall pipes and pond and lake outlets and spillways. In addition, natural drainageways will be examined before and after each rainy season and measures implemented to repair and control identified areas of erosion, incising or head cutting. Emphasis should be placed on vulnerable areas (i.e., those exhibiting steep slopes and/or relatively erodible soil types).

Mitigation Measure H-G: Design runoff detention basins to promote solids settling and provide capacity for accumulated sediment

Mitigation Measure H-G applies to Impacts H-5, B-17, and B-18

The Applicant proposes several runoff detention basins to mitigate potential hydrologic impacts caused by increased runoff volume. These basins will also be designed as structural BMPs to control potential sediment discharges to receiving surface water bodies. The design will consider peak flows and provide for excess capacity to accommodate accumulated sediment. The Applicant will provide for long-term operation and maintenance of the basins by the Homeowners Association through incorporation of provisions in the CC&Rs.

Mitigation Measure H-H: Finalize and implement the Applicant's Lake Management Plan for constructed lakes and wetlands areas

Mitigation Measure H-H applies to Impacts H-6, H-7, B-18, and B-19.

The Applicant proposes to construct several man-made lakes in the Meadows area of the proposed project. These lakes are planned to function as natural ecosystems with vegetation appropriate to lake and/or wetlands habitat and will receive stormwater runoff from a portion of the project site. The lake systems will likely be attractive to wild waterfowl, and residents might potentially introduce fish and/or birds. Based on the results of the preliminary geotechnical investigation, the local groundwater table in this area is relatively shallow, and groundwater may therefore be encountered during construction of the lakes. If the system is designed properly, including consideration of lake depth, surface area, types of vegetation, and vegetation densities, the system would tend to provide for natural degradation of organic waste products which would otherwise tend to infiltrate and impact groundwater quality. Additionally, such a design will also promote biological treatment of organic pollutants introduced into runoff in catchment areas draining into the lake system, thereby allowing the lakes to function as a storm water structural BMP. A draft Lake Management Plan has been developed in concert with appropriately trained specialists in the field of aquatic ecosystems, and includes specific plans for vegetation types and densities that will support and promote long-term health of the system while minimizing the need for maintenance. The plan also addresses maintenance requirements, present a monitoring program to ensure

that the system continues to function as designed following project buildout, and identify parties responsible for maintaining the system. Because the lakes are part of the natural open space areas dedicated to the County, the County will be responsible for the long-term operation and maintenance of the lakes.

The Final Lake Management Plan shall include (but not be limited to) the following items:

1. Section 1 – Project Description of Lakes: Characterize water quality from Caperton Canal; identify expected volume of make-up water; monitor total dissolved solids in make-up water to ensure that it will not adversely affect existing water quality coming from Caperton Canal.

2. Section 2 – Lake Construction: Calculate the estimated seepage rate for the method chosen for sealing lake bottoms, and choose a method (among the alternatives presented in the draft plan) that does not allow high seepage rates. Provide a complete description of lake maintenance infrastructure that will achieve the objectives of the plan.

3. Section 3 – Lake Management: Identify the parties responsible for maintaining the lake management systems. In Section 3.1, describe the nutrient input control and turnover rates necessary to ensure proper maintenance. Finalize the description of the revegetation plan (include additional mid- and low-level species to ensure sufficient habitat during the natural revegetation period; specify recommended flora densities). In Section 3.6, identify soil erosion techniques and implementation procedures to control soil erosion. In Section 3.8, identify management techniques to control aquatic invertebrates and fish species that might become established in the lakes.

4. Section 4 – Recreation: Identify provisions for non-destructive access to the lakes for non-motorized boats.

5. Section 5 – Lake Monitoring: Monitor Lakes Six and Seven for total petroleum as oil, total petroleum as gasoline, and semivolatile organic compounds to ensure that contamination from the road intersecting the two lakes and the associated traffic does not adversely affect water quality, using RWQCB standards. For the first year, collect and analyze one sample per quarter. If no contamination is detected, monitoring activity could be decreased to an annual or semiannual schedule.

   For all lakes, include monitoring for pesticides and herbicides used on the golf course, using RWQCB standards, monthly for the first two years and quarterly for the subsequent three years unless contamination is present at levels indicating that continued monitoring is appropriate.

   For Lakes One, Two, and Three, monitor for contamination that might result from activities on this property, such as leakage from the septic tank and sediment accumulations due to erosion.

6. Section 6 – Water Quality Corrective Actions: Develop a corrective action threshold above 5 mg/L for dissolved oxygen in order to ensure that the health of lake biota is not jeopardized by a sudden decrease in dissolved oxygen levels. Identify corrective action for contamination resulting from runoff from the road, from chemical usage, and from activities on the NAPOTS property affecting lake water (if any).

7. Section 7 – Corrective Action Management Alternatives to Common Problems: Delete full draw down or the use of dyes as two alternative methods for managing nuisance aquatic vegetation. Revise Section 7.2 regarding muddy water to identify the cause(s) of the turbidity and implement

a management strategy to ensure its reduction, rather than treating the effects. Identify appropriate fishing seasons for each species of game fish identified in Section 7.3.

Implementation of a Lake Management Plan approved by the County would adequately address impacts associated with the constructed lakes and wetland areas.

Mitigation Measure H-I: Design and construct improvements to protect water quality in canals in accordance with PCWA standards and County requirements for a 100-foot setback from structures

Mitigation Measure H-I applies to Impact H-6.

The proposed project provides for improvements to Antelope and Caperton canals that include realignment, canal lining and pipe encasement. However, portions of open canal will remain within open space and other common areas. These open segments could receive potentially contaminated runoff unless specific measures are implemented.

Both the County's General Plan and the zoning ordinance are intended to protect canals, as well as streams. Therefore, a 100-foot property line setback from all canals is required to mitigate potential adverse water quality impacts on this watershed and the bodies of water associated with domestic water supplies.

By providing setbacks and requiring design and construction of runoff controls and/or other engineered means of water quality protection in accordance with PCWA standards, Mitigation Measure H-I would reduce the impact to less than significant. Maintenance of these controls would be the responsibility of the owner(s) of the land upon which the improvements reside.

Mitigation Measure H-J: Implement Placer County policies and ordinances related to permitting, design, construction, and maintenance of septic systems

Mitigation Measure H-J applies to Impacts H-7 and G-9.

Placer County has developed standards for design, construction, and maintenance of septic systems, including requirements for maximum and minimum allowable percolation rates, minimum distance from leach fields to the groundwater table, minimum offsets from streams and water supply pipelines, and system design standards based on site-specific conditions. The Applicant has completed studies which concluded that each of the affected parcels is capable of supporting a domestic septic system. Each septic system will be permitted individually by Placer County upon demonstration that site conditions and the proposed site-specific septic system design do not pose a threat to groundwater or surface water quality. Parcels that do not meet Placer County's minimum standards (if any) will be connected to the sanitary sewer.

Appropriate operation and maintenance of septic systems will be the responsibility of the individual property owner. The CC&Rs will include provisions to ensure that purchasers are aware of the applicable regulatory requirements and agree to comply.

Mitigation Measure H-K: Notify Placer County Department of Environmental Health and affected property owners if off-site sewer pipeline breaks

Mitigation Measure H-K applies to Impact H-7.

If there is a breakage of the off-site sewer line along SR 193, the owner of the sewer (the Applicant, or the JPA, or another entity) will be responsible for notifying the Placer County Department of Environmental Health and the adjacent property owners that may have water wells within 50 feet of the pipeline. To the extent that the sewer pipeline break affects a particular well, the sewer pipeline owner will compensate the well owner for damages sustained.

Other Mitigation Measures: Mitigation Measure G-B, Prepare and implement a grading and erosion plan, is discussed in Chapter 10. Mitigation Measure HW-F, Finalize and implement the Applicant's Golf Course Chemical Application Management Plan, is discussed in Chapter 11.